Home Inverter

1600W-3500W

USER MANUAL

Pure Sine Wave Home Inverter

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Thanks for using our products.
Please strictly obey all the instructions in this manual and pay attention to all the warning and operation information. It is not advisable to install or operate the machine before reading this manual.

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1 Introduction

1.1 Introduction of Inverter

1 .The Home Inverter not only is an inverter but also contains a powerful smart charger.

2. The Home Inverter can generating pure sine wave from a 24V - battery bank, which can supply energy to various loads such as resistive load (heater),inductive load (air conditioners, refrigerator),motors (vacuum cleaners), and rectifier load (computer). All Home Inverter are designed to work in heavy load condition. De-rating is not necessary.

3 .The smart charger work with three steps charge way in order to improve the battery life. Clients can set the charging current and voltage according to the battery type and capacity. Efficient high-power charging current, the battery can be quickly recharged. The switch module automatically diverts the energy transfer path between inverter and utility source. When the utility source is lower than the transfer level, the path switches to battery mode. Otherwise the load is conducted to the utility source. The transfer time is 1/4~1/2 of the total cycle time. The high power charger (80A) can charge a 24V/1000 AH battery bank in 14 hours. By the way, the inverter can work with generator which can prolong the battery life.

4 .Home Inverter can also work in mains mode (AC input normal) without battery, and battery can be replaced with the machine on. Visible and audible LCD display and buzzer can help users understand the working condition of machine, battery and mains condition, quickly determine various failures, to improve work efficiency.

5 .Home Inverter is an extremely good choice for utility back up power. However, it also can be used as a UPS for computers.

6 .An inverter, charger and switching box can be replaced with a single Home Inverter unit

1.2 Important Safety Instructions

1.2.1 General Precautions

1. Before using the Home Inverter, please read all instructions and cautionary marks on
   ① the inverter,
   ② the batteries
   ③ all appropriate sections of this instruction manual.

2 .Do not expose Home Inverter to rain, snow, or liquids of any type. The Home Inverter is designed for indoor mounting only. Protect the inverter from splashing if used in vehicle applications.

3 .Do not disassemble the Home Inverter; take it to a qualified service center when service or maintenance is required. Incorrect re-assembly may result in risk of electric shock or fire.

4 .To reduce risk of electric shock, disconnect all wiring before making any attempt to maintain or clean. Simply turning off the inverter will not reduce this risk.

Warning! Working in the vicinity of a lead acid battery is dangerous; Batteries generate explosive gases during normal operation.

5 .Provide ventilation to outdoors from the battery compartment. The battery enclosure should be designed to prevent accumulation and concentration of hydrogen "pockets" at the top of the compartment. Vent the battery compartment from the highest point. A sloped lid can also be used to direct the flow through the vent opening location.

6 .Never charge a frozen battery.

7.Shuck off 10-12mm insulated cable from AC cable,15-20mm cable from the DC cable. In order to connection with inverter well. Be extra cautious when working with metal tools on or around batteries. The potential of dropping a tool causing the batteries or other electrical parts resulting in sparks could cause an explosion.

8. The inverter must be used with a battery supply of nominal voltage that matches the last two digits of the model number; e.g. 24 volts with a Home Inverter 1600W, Home Inverter 2500W, Home Inverter 3500W.

9. Grounding instructions. This battery charger should be connected to a grounded, to insure safe, permanent wiring system. For most installations, the negative battery conductor should be bonded to the grounding system at one, and only one, point in the system. All installations should comply with all national and local codes and ordinances.

1.2.2 Personal Precautions

1. Someone should be within voice range when you work near batteries in case of an emergency.

2. Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing, or eyes.

3. Wear complete eye and clothing protection. Avoid touching eyes while working near batteries. Wash your hands when done.

4. If battery acid contacts skin or clothing, immediately wash with soap. If acid enters eyes immediately, flood eyes with cool, running water for at least 15 minutes. Immediately seek medical attention.

5. Never smoke or allow a spark or flame in the vicinity of a battery or generator, to avoid fire.

6. Be extra cautious when working with metal tools on and around batteries. The potential of dropping a tool causing the batteries or other electrical parts resulting in sparks could cause an explosion.

7. Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a battery. A battery can produce a short -circuit current, which is high enough to weld a ring or the like to metal causing severe burns.

8. In well connected system, if repairing related equipment (such as electricity, generators, etc.), make sure that the inverter and other equipment has been completely closed, to avoid accidents.

1.3 Indicator and Setting

1.3.1 Map of Controls and LED/LCD Indicators and buzzer

Shown below are the control panel and indicator lights on the front of the Home Inverter. These controls can provide information in either inverter or battery charging mode of the operation. All models of the Home Inverter series operate identically.

LED and Alarm Indicator for 24V system

LED	Green	red	Alarm	Note
AC mode	On	Off	Beep once	
Battery mode	Flashes 1 / 2 sec	Off	Beep once	
ECO	Flashes 1 / 4 sec	Off	Off	
Self- test	Flashes 1 / 1 sec	Flashes 1 / 1 sec	Off	Boot
Low battery	Flashes 1 / 2 sec	Flashes 0.5/sec	Beep 1 @ 0.5 sec	
AC high voltage	Off	On	Beep 1 @ 0.5 sec	Charger off
Overload 110%	Flashes 1 / 2 sec	On	Beep 1 @ 0.5 sec	Output off after 15min
Overload 120%	Flashes 1 / 2 sec	On	Keep on beeping for 60s	Output off after 60s
Overload 150%	Flashes 1 / 2 sec	On	Keep on beeping for 60s	Output off immediately
Press confirm button	No change	No change	Beep once	
Battery mode, output short circuit	Off	On	Keep on beeping for 60s	Output off immediately
Battery mode over temp	Off	On	Keep on beeping for 60s	Output off immediately
AC mode over temp.	On	On	Keep on beeping for 60s	charger off immediately
Over current (AC mode)	Off	On	Keep on beeping for 60s	Output and charger off immediately
System fault	Off	On	Keep on beeping for 60s	

>>Power Switch

The Power ON/OFF button is located in the left of the panel. Once the Home Inverter has been properly installed and the batteries are connected, please press the button to power the Home Inverter for 3s. This will alternately turn the Home Inverter on and off. When the button is depressed, the buzzer will beep to announce that the button is being pushed down. Depressing the switch will toggle the working stage between on and off.

Note:

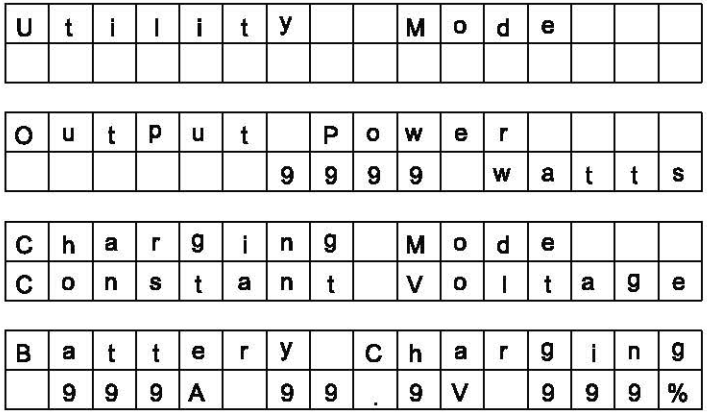
1. When connected to batteries, the Home Inverter will begin the process without AC source input. The Home Inverter can be activated by pushing the on/off button.

2. When there are no battery connected, but the AC was normal, The Home Inverter can work in utility mode by pressing the button.

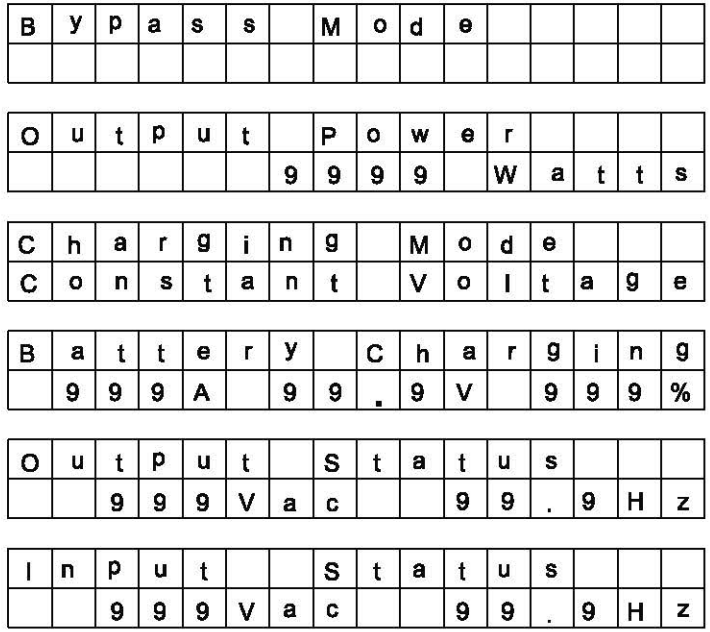
>>LCD display information

Including AC mode, battery mode, generator mode, check the information with up and down button.

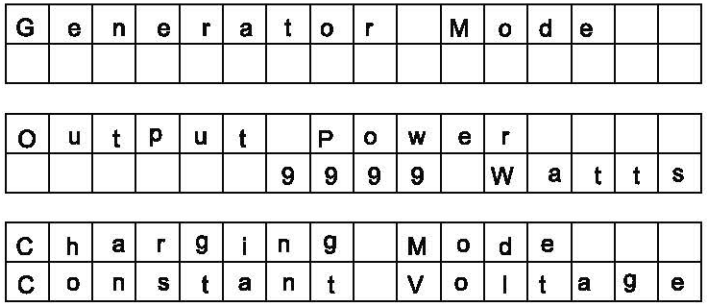
① AC mode



②Bypass Mode



③Generator mode



B	a	t	t	e	r	y		C	h	a	r	g	i	n	g
9	9	9	A		9	9	.	9	V		9	9	9	%	

O	u	t	p	u	t		S	t	a	t	u	s			
		9	9	9	V	a	c			9	9	.	9	H	z

I	n	p	u	t			S	t	a	t	u	s			
		9	9	9	V	a	c			9	9	.	9	H	z

④Battery mode

I	n	v	e	r	t	e	r		M	o	d	e			

B	a	t	t	e	r	y		S	t	a	t	u	s		
		9	9	.	9	V	d	c			9	9	9	%	

O	u	t	p	u	t		P	o	w	e	r				
						9	9	9	9		W	a	t	t	s

O	u	t	p	u	t		S	t	a	t	u	s			
		9	9	9	V	a	c			9	9	.	9	H	z

I	n	p	u	t			S	t	a	t	u	s			
		9	9	9	V	a	c			9	9	.	9	H	z

⑤ECO mode

P	o	w	e	r		S	a	v	e		M	o	d	e	

⑥Replace battery

R	e	p	l	a	c	e		B	a	t	t	e	r	y	

>>ECO mode operation

Press ENT and ▲ for 2s, inverter will go to ECO mode.(load must be less than 20w,press ENT and ▲ again for long time, it will quit ECO mode. The ECO mode was used in battery mode, this function was used for avoiding unnecessary discharge without load. When load over 30w, it will back to normal.

>>Self-test

When inverter working,"self-test "will show on LCD while red/green LED flashing.

>>Setting mode

Press the ENT for 2s, inverter go to setting mode, red/green LED flashing and then set the value with▲and ▼; press the ENT to confirm.

a)Generator mode = Enable / Disable (Default = Disable)

b)Battery Boost Voltage = 28 ~ 30.0 V DC for 24V system (Standard=28VDC)

c)Battery Floating Voltage = 26 ~ 28.0VDC for 24V system (Standard= 27.0VDC)Notice: all kinds of battery voltage setting:

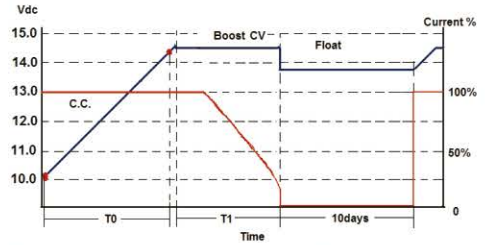
Notice: all kinds of battery voltage setting:

Number	Description	Boost Voltage	Float Voltage
		24V	24V
1	To be used by factory for set up	28.8	27.2
2	Gel USA	28.0	27.4
3	AGM 1	28.2	26.8
4	AGM 2	29.2	27.4
5	Sealed lead acid	28.8	27.2
6	Gel EURO	28.8	27.6
7	Open lead acid	29.6	26.6
8	Calcuim	30.0	27.1

d)Charging Current = 10 ~ 70A 10 A for one step (Standard 50A)

Note ：please set the charging current according to the capacity of the battery, high charging current will result in battery over temperature. Please set the charging current the Min when battery is small capacity ：Charging voltage should be set according to battery type, otherwise battery will be over charged and damaged.

Charging progress of battery：

Progress	Three stage :CC(Constant current)Boost CV(Constant voltage)Float(float charge)
Charging transformation definition	 T0 = from starting to finishing.(Constant current) T1 = 10 x T0(Constant voltage)at least 1 hour, Max time= 12 hours.
Charging voltage @25℃	User can set the constant voltage and floating voltage according to the battery.

2 Installation and Operation

2.1 Installation

2.1.1 Environment

1.Home Inverter is a sophisticated electronic device and should be treated carefully. When selecting the operating environment for the inverter, do not think of it in the same terms as other equipment that works with it; e.g., batteries, diesel generators, motor generators, washing machines, etc. It is a highly complex microprocessor controlled device. Generally speaking, it is a cousin to stereo equipment, television sets, and computers. The use of conformed coated circuit boards, plated copper bus bars, powder coated metal components, and stainless steel fasteners allows the unit to function in hostile environments. However, in a condensing environment (one in which humidity and/or temperature change causes water to form on components) all the ingredients for electrolysis is present - water, electricity, and metals. In a condensing environment the life expectancy of the inverter cannot be determined and the warranty is voided.

2.Caution: It is in your best interest to install the inverter in a dry protected location away from sources of high temperature and moisture. Exposure to saltwater is particularly destructive and potentially hazardous.

3.Locate the inverter as close as possible to the batteries in order to keep the battery cables short. However, do not locate the inverter in the same compartment as non-sealed batteries. (The inverter may be located in a compartment with sealed electronic equipment - and everything else. Batteries also generate hydrogen and oxygen. If accumulated, this combination could be ignited by an arc resulting from connection of the battery cables or by switching a relay.

4.Do not mount the inverter in a closed container. Unrestricted airflow is required to operate at high power for sustained periods of time. Without it, the protection circuitry will activate and reduce the maximum power available.

2.1.2 Grounding System

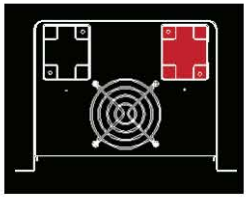
Metal shell and ground terminal have been connected inside the machine, please connect the ground terminal to ground, in order to reduce the risk of electric shock

2.2 Installation Diagrams

2.2.1 Terminal Block (AC Side)

Input			Output		
L	N	GND	GND	N	L

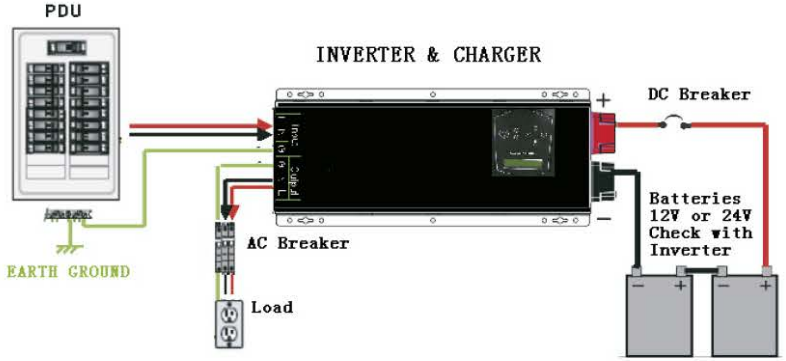
2.2.2 Terminal (DC Side)



2.2.3 (Wire Gage)

	AC INPUT	AC OUTPUT	DC Input
	220V	220V	
1600W	16AWG	16AWG	16 mm2
2500W	14AWG	14AWG	35 mm2
3500W	12AWG	12AWG	50mm2

2.2.4 Simple Installation Diagram



2.3 Installation Steps

- Step 1

  Connect the inverter with battery, AC and load according to the diagram. Confirm all wiring connected well and terminal is tight.

- Step 2

  Check all the voltage rating is correct. Close the circuit breaker.

- Step 3

  Press the on/off button. The system will start working after a few seconds. If the mains power fails the unit will work in Inverter mode. If not, the system will switch to AC mode and supply power to load and battery.

3 AC mode

In AC mode, the inverter working in bypass mode and charge the battery

3.1 How to replace the battery in AC mode

Please press ENT and ▼ for 2s, inverter will go to battery change mode, open the battery breaker before replacing the battery. When replacing the battery, make sure the battery positive and negative was connected right . After finishing, close the battery breaker, and then press the ENT and ▼ to quit the battery change mode.

3.2 Transfer Switching Speed

The transfer time between AC mode and battery was 16+/-4ms.

4 Battery

4.1 Battery Size

1.Batteries are the inverter's fuel tank. The larger batteries are , the longer inverter can operate before recharging is necessary. An undersized battery bank results in reducing battery life and disappointing system performance.

2.Batteries should not be regularly discharged to the limit of more than 50% of their capacity. Under extreme conditions, such as a severe storm or a long utility outage, cycling to a discharge level of 80% is acceptable. Totally discharging a battery may result in permanent damage and reduced life.

4.1.1 Estimating Batteries Requirement

In order to determine the proper battery bank capacity, it is necessary to compute the number of amp hours that will be used during charging cycles. When the required amp hours are known, the expected amp hour usage ensures to be twice as this amount. Doubling the expected amp hour usage ensures that the batteries will not be over discharged and extends battery life. To compute total amp hours usage, the amp hour requirements of each appliance that is to be used is determined and then added together.

If we know the load power W and battery voltage V and the needed back up time T , we can calculate the battery discharging current I as follow:

I =W/V So
AH=I*T=W*T/V So
Needed battery capacity was 2W*T/V

Motors are normally marked with their running current rather than their starting current. Starting current may be three to six times running current. Manufacturer's literature may provide more accurate information than the motor nameplate. For larger motors, increasing the battery capacity should be required.

4.2 Monthly Maintenance

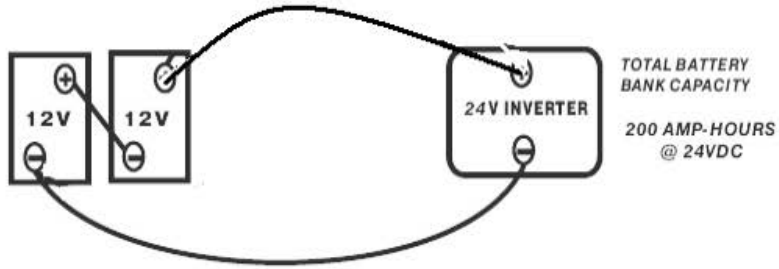
Checking the condition of battery connection once a month (Battery maintenance-related details, please refer to the user manual battery) . Make sure the battery cable is not loose, battery terminals not corrode . Any corrosion will lead wires disconnected, use soda water to clean, careful not to let soda water into the cell. In order to reduce corrosion of the battery terminals, battery terminals should be smeared with a thin layer of oil ointment or anti-corrosion grease (which can be from automotive supplies stores or battery suppliers get). Do not put anything between the battery terminals and wires , metal should be used to connect, tighten the screws, and then attach the protective sleeve.

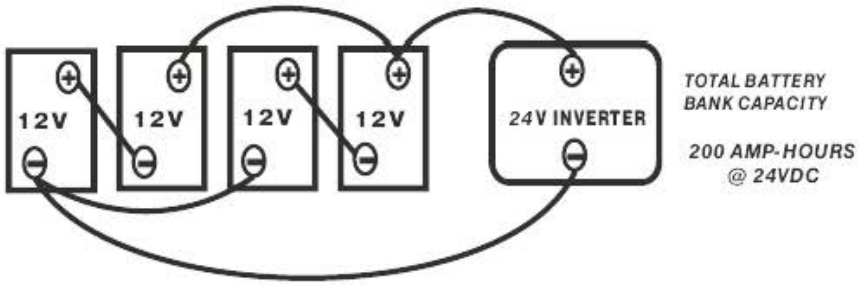
4.3 Battery Hook-up Configurations

Battery banks of substantial size can be configured by connecting several smaller batteries. There are three ways to do this. Batteries can be connected in parallel, series, or series -parallel.

4.3.1 Series Connection

When batteries are connected with the positive terminal of one to the negative terminal of the next, they are connected in series. In a series configuration the battery bank has the same amp/hour rating as a single battery and an overall voltage equal to the sum of the individual batteries. This is common with 24 volt or higher battery-inverter systems.





4.4 Battery Installation

Caution: Batteries can produce extremely high currents in short-circuit. Be very careful working around them. Read the important safety instructions at the beginning of this manual and the battery supplier's precautions before installing the inverter and batteries.

4.4.1 Battery Location

The battery must be as close as possible to the inverter, but not hinder to disconnect the inverter. Because this series inverter DC wiring terminal is located in the left, so the battery is best placed to the left. Do not put the inverter with no sealed battery compartment at the same place (sealed can). Because the battery with the generated gas is corrosive, will reduce the life of the inverter. Wiring from the battery to the inverter should not be too long, the DC voltage 12V systems with 4/0 AWG wiring should not be more than 5 ft.; DC voltage 24 volt system with a 4/0 AWG wiring should be no more than 10 ft.; simple and reduce losses.

4.4.2 Battery Enclosure

To prevent access from untrained personal, batteries should be protected within a ventilated, locked enclosure or room. The enclosed should be ventilated to the outdoors from the highest point to prevent accumulation of hydrogen gasses that are released in the battery charging process. An air intake should also be provided at a low point in the enclosure to allow air to enter in order to promote good ventilation. For most systems a one-inch diameter vent pipe from the top of the enclosure is adequate to prevent accumulation of hydrogen. A sloped top can help direct the hydrogen to the vent location and prevent pockets of hydrogen from occurring. The enclosure should also be capable of holding at least one battery cell worth of electrolyte in the event a spill or leak occurs. The enclosure should be made of acid resistant material or have an acid resistant finish applied to resist the corrosion from spilled electrolyte and released fumes. If the batteries are located out of doors the enclosure should be rainproof and have mesh screens over any openings to prevent insects and rodents from entering.

4.4.3 Battery Cabling

Heavy cables should be used to connect individual batteries to configure a larger battery bank. The actual size of the cable depends upon whether the batteries are connected in parallel or series. Generally, the cables should not be smaller than the main battery cables to the inverter. If the main cables are 4/0 AWG the battery interconnects should be 4/0 AWG.

It is usually preferable to connect the batteries firstly in series and then in parallel when connecting smaller batteries, which would reduce the confusion of wiring. If you want to improve battery performance, please contact your battery supplier, they will provide more favorable configuration for your connection system .

5 Technical Specification

Standard \ Model		1600W	2500W	3500W
Battery Input	DC voltage	24V		
	DC voltage range	20V-30V		
	W/O bat. AC normal	Working normally		
AC input	Max Input current	20A	25A	35A
	I/P voltage range	155V-280V for220V		
	I/P frequency	50Hz / 60Hz(Auto testing)		
	Generator	Yes		
Output	DC mode output voltage	220V(+/-10%)		
	AC mode output voltage	180-245V±5% for 220V		
	O/P frequency	50Hz/60Hz (+/-0.3Hz)		
	O/P waveform	Pure sine wave		
	O/P capacity	1600W	2500W	3500W
	Max surge protect	4800W	7500W	10500W
	ECO mode	<20W		
	Max efficiency	>80%		
	Transfer time	16+/-4ms		
	Power factor	0.8 - 1.0		
	Inductance load	Yes		
	Capacitance load	Yes		
	Resistance load	Yes		
Charger	Current adjustable	10-40A	10-70A	10-70A
	Voltage adjustable	26V-30V		
	Charge mode	3 step-Bulk, Boost, Float		
Others	Display and alarm	LCD&LED&Buzzer		
	Working temp.	0℃-40℃		
	Working Humidity	5%-95%RH		
	Cooling way	Fan cooling		
	Weight(kg)	20	22	23
	Dimension W*L*H	360*600*293		360*630*293

Technical Specifications subject to change without notification.

6 Troubleshooting

1.A small capacity battery being charged with a higher charging rate could cause an over voltage shutdown. Please reduce the charge rate.

2.If system does not turn on properly , turn off the breaker before the DC side, disconnect the system from battery for 30 seconds, and then repeat the turn on steps. If the system still can't work, please contact your dealer.

7 Service and Support

If you have any questions or problems with the inverter, call your Local Distributor to ask for a technical representative.

Please have the following information ready when you call the Local Distributor:

- Model number
- Serial number
- Date of failure or problem
- Phenomenon of failure or problem
- Customer returns address and contact information